

The lower housing **16** further includes an external opening **22** for receiving the antenna. In a preferred embodiment, the antenna housing **12a** includes a threaded portion **12c** near its top that is screwed into corresponding threads molded into the external opening **22**. When the upper and lower housings are assembled together, the external opening **22** is in line with the apertures in the interlock tabs, thereby allowing the antenna to be inserted through the external opening and the apertures in the interlock tabs and then screwed into place.

Although in the present embodiment the external opening **22** is threaded, and molded into the lower housing **16**, it will be appreciated that alternative structures may also be used in accordance with the present invention. For example, the external opening can be formed in the upper housing rather than the lower housing. Alternatively, the external opening can be formed by molding corresponding half openings into the upper and lower housings. In addition, it is also possible to use a twist fit or a snap fit arrangement to hold the antenna housing in place.

It will be seen that the antenna housing **12a**, in combination with the interlock tabs **18a**, **18b**, **20a**, **20b**, serves to lock the upper and lower housings **14**, **16** together. The antenna unit **12a**, **12b** is coupled to the telephone circuitry by means of an antenna clip or other contact device. Preferably, the antenna clip lies in the path of the antenna unit **12a**, **12b** so that insertion of the antenna housing **12a** into the receiving apertures in the interlock tabs **18a**, **18b**, **20a**, **20b** also brings the antenna unit into contact with the antenna clip.

As further shown in FIG. **2**, the presently preferred embodiment also includes corresponding snap elements **24a**, **24b** molded into the bottom edge of the upper and lower housings **14**, **16** that snap together. The snap elements are provided to hold one end of the upper and lower housings **14**, **16** together until the antenna housing **12a** can be inserted through the receiving apertures down the full length of the telephone. In addition, the snap elements **24a**, **24b** provide additional stability to the telephone **10** after it is assembled. It would also be possible to substitute a hinge element for the snap elements, or a combination of hinge and snap elements, as well as other fastening elements, as desired.

FIGS. **3A–C** show, respectively, interior, left side, and exterior views of an upper housing **14** according to present invention. FIG. **3D** shows a cross section of the upper housing **14** taken through the plane D—D shown in FIG. **3C**, and FIG. **3E** shows a top view. The apertures **26a**, **26b** in the interlock tabs **18a**, **18b** for receiving the antenna housing **12b** can be seen in these figures. It will be appreciated that the interlock tabs **18a**, **18b** have a relatively small footprint. That means that it is possible to add them to existing designs with a minimum of retooling.

FIGS. **3A–E** show an upper housing for use in a portable telephone unit. As such, the upper housing **14** includes on its front face an array of holes **30** to accommodate a keypad, as well as a window **32** for a display, an earpiece **34** and a mouthpiece **36**. Of course, it would be possible to practice the present invention with other types of electrical devices as well.

FIGS. **4A** and **4B** show, respectively, exterior and perspective interior views of a lower housing **16** for use with the upper housing **14** shown in FIGS. **3A–E**. Again, it is apparent that the footprint of the interlock system is small enough so that it can be incorporated in present designs with a minimum of retooling.

FIG. **5** shows an exploded view of a complete portable telephone incorporating the present invention. It is contemplated

that the telephone will be first completely assembled without the antenna unit **12a**, **12b**. As described above, one embodiment of the present invention includes corresponding snap elements along the bottom edge of the upper and lower housings **14**, **16** of the telephone **10** to hold the housings together until the antenna unit is inserted into the receiving apertures in the interlock tabs. It would, of course, also be possible to practice the present invention without the lower snap elements by manually holding the upper and lower housing together until the antenna unit is inserted.

The final stage of manufacture is the insertion of the antenna unit **12a**, **12b** into the receiving apertures **26a**, **26b**, **28a**, **28b** in the interlock tabs. Because all of the receiving apertures are now in alignment, a pathway is defined to receive the antenna housing. The antenna housing **12a** is slid down the length of the pathway and then screwed into place using the corresponding threads on the antenna housing and the external opening.

The telephone may be disassembled for repair or maintenance by simply unscrewing the antenna housing **12a** and pulling it out of the telephone. It will be appreciated that once the repairs are made, the telephone can be quickly reassembled in the field without the need for a screwdriver or other tool.

When assembled, the telephone exhibits enhanced strength because of the use of the antenna unit as both an antenna and as a brace extending down the length of the telephone. Thus, it will be appreciated that the present design exhibits greater resistance to breakage than the use of screws or other fastening elements currently used.

While the foregoing description includes detail which will enable those skilled in the art to practice the invention, it should be recognized that the description is illustrative in nature and that many modifications and variations thereof will be apparent to those skilled in the art having the benefit of these teachings. It is accordingly intended that the invention herein be defined solely by the claims appended hereto and that the claims be interpreted as broadly as permitted by the prior art.

We claim:

1. An antenna interlock system, comprising:
an upper housing and a lower housing;

first and second interlock tabs disposed along the interior wall of the upper housing and third and fourth interlock tabs disposed along the interior wall of the lower housing, each interlock tab having an aperture shaped to closely receive an antenna unit,

the interlock tabs being disposed relative to each other such that when the upper and lower housings are assembled together, the apertures in the interlock tabs together define a pathway for receiving the antenna unit, and such that when the antenna unit is inserted through the receiving apertures, the antenna unit and the interlock tabs hold the upper and lower housings together.

2. A system according to claim 1, wherein the interlock tabs are disposed relative to each other such that when the lower and upper housings are assembled together, the first and second interlock tabs lie between the third and fourth interlock tabs, abutting them, thereby providing stability to the upper and lower housings along the longitudinal axis of the antenna unit.

3. A system according to claim 1, wherein the lower housing includes an external antenna opening for receiving the antenna unit, the external antenna opening being positioned such that when the upper and lower housings are